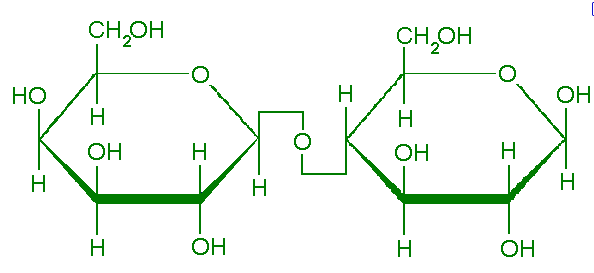
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**Unit 2 Exam Practice Exam Questions**

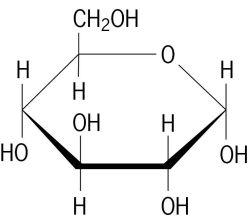
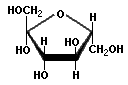
***Note: I wrote up these questions using our lecture slides from last year. While they are very similar—and often identical—to the ones used this year, some may vary slightly be different…so a couple of the questions on here might not have been covered in your lectures. If you find any errors, please let me know. I have also indicated the sections under which you can find the question topics.***

Carbohydrates:

1. 

This disaccharide is the primary sugar component in milk. What are the component monosaccharides that make up this disaccharide?

1. α-Mannose & β-Glucose
2. α-Glucose & α-Galactose
3. α-Galactose & β-Glucose
4. β-Galactose & β-Glucose
5. β-Galactose & α-Glucose

2. **A**  **B** 

The above sugars are monosaccharides. These sugars are involved in numerous biological reactions and components in disaccharides. How are these monosaccharides different?

1. **A** is a Pentose and **B** is a Hexose
2. **A** is a Ketose and **B** is an Aldose
3. **A** is an Aldose and **B** is a Ketose
4. **A** can be used as a source of energy and **B** can not
5. **A** is a component of Sucrose and **B** is a component of Lactose

3. A body builder is in the gym lifting weights. He has not eaten anything in about 2 hours and is doing an intense workout. What glycosidic linkages are being broken to help provide this body builders muscle cells with glucose for energy use?

a. α-1:4 Linkages

b. β-1:4 Linkages

c. β-1:6 Linkages

d. α-1:6 Linkages

e. A, B, & D

f. A & D.

Cartilage and Joints:

4. Osteogenesis Imperfecta is a disorder that involves defects in the synthesis of Collagen Type I fibers. This disease is characterized by having brittle and malformed bones along with the occasional occurrence of a blue sclera in the eye. What type of cartilage may also be affected in this disease?

a. Hyaline Cartilage

b. Fibrocartilage

c. Elastic Cartilage

d. Reticular Cartilage

5. An Orthopedic surgeon is doing surgery on the knee of a patient to repair torn articular cartilage. What is the order of structures that the surgeon must go through from exterior to interior during the repair of this joint?

a. Articular Capsule, Synovial Cavity, Synovial Membrane, Articular Cartilage

b. Articular Capsule, Synovial Membrane, Synovial Cavity, Articular Cartilage

c. Synovial Membrane, Articular Capsule, Synovial Cavity, Articular Cartilage

d. Synovial Cavity, Synovial Membrane, Articular Capsule, Articular Cartilage

6. An 80 year-old man comes into your office. He is complaining of excessive joint pain and stiffness in his fingers and toes. You notice that the patient has swelling and redness at the joints of the fingers and toes. Upon X-ray you do not notice any bone spurring. If a fluid sample was taken of this patient’s joints what would protein analysis most likely find?

a. Chondrocytes from degradation of hyaline cartilage

b. Antibodies against hyaline cartilage

c. Fibrocytes

d. Osteocytes

Bone and Bone Development:

7. During remodeling, osteoclasts breakdown and remove old bone to make room for new bone to be laid down by osteoblasts. All of the following enzymes are used by osteoclasts to aid in the breakdown of bone during remodeling **EXCEPT**?

a. Elastase

b. Collagenase

c. Alkaline Phosphatase

d. Carbonic Anhydrase

e. None of the Above

8. Initially following development of bone tissue many osteons can be closely packet together to form

a. Compact bone with many Osteocytes connected by canaliculi forming woven bone

b. Trabecular bone with few Osteocytes making up lamellar bone

c. Compact bone with concentric rings of Osteocytes forming lamellar bone

d. Trabecular bone with many Osteocytes forming woven bone

9. A 50 year-old female patient comes to the ER with a broken arm. She also is complaining that she has been having hallucinations and also has trouble lifting objects she could normally lift. A blood screen for electrolytes reveals that her blood calcium level is very low. What would you expect to be found if further analysis of this patient’s blood were to be done?

a. Increased samatotropin levels

b. Increased calcitonin levels

c. Decreased levels of Vitamin A

d. Increased parathyroid hormone levels

10. You are looking at an X-Ray of a patient who has come to the office complaining of extreme leg pain. You notice there is a fine line near the knee joint. The resident suggests that there is a fracture at this point causing the leg pain. You suggest

a. The resident is correct and there is a fracture

b. This may be an artifact caused by the closure of the epiphyseal plate

c. Remodeling of the bone is occurring which is creating the line

d. The patient has chipped her bone

11. Intramembranous ossification

a. Occurs by appositional growth

b. Occurs by interstitial growth

c. Initially forms lamellar bone

d. Initially forms compact bone

12. During repair of a fractured bone all of the following processes occur EXCEPT

a. Intramembranous ossification

b. Endochondral ossification

c. Dying back of Haversian systems

d. Invasion of macrophages

e. None of the above

Glycolysis:

13. After a meal, glucose levels in the body are very high. As a result the TCA cycle is running at full force producing lots of citrate resulting in lots of ATP production by the electron transport chain. This results in

a. Reduced flow through glycolysis

b. Increased flow through glycolysis

c. Decreased ATP production by glycolysis

d. Increase in lactic acid levels

14. A cell takes in 16 molecules of glucose. How many total ATP is produced by glycolysis in this situation?

a. 64

b. 32

c. 144

d. 112

15. A body builder decides to go out for a night on the town to consume alcohol after an intense workout. You explain to him that this isn’t a good idea if he wants to build muscle mass more efficiently. What is the basis for your explanation?

a. The alcohol will cause build up of fat in the liver

b. Alcohol will cause reduced absorption of Thiamine

c. The breakdown of Alcohol will use up NAD+ in the muscle cells

d. Will halt glycolysis

Lipids - Beta-Oxidation and Fatty acid Synthesis:

16. How many Net ATP can be produced by the breakdown of 2 Oleates

a. 64

b. 237

c. 244

d. 180

17. In β-Oxidation within the mitochondria \_\_\_\_\_\_ is the electron acceptor where as in β oxidation within peroxisomes \_\_\_\_\_ is the electron acceptor.

a. NAD+, O2

b. NAD+, H2O2

c. NAD+/FAD, O2

d. NAD+/FAD, H2O2

18. A football player does not eat before a football game. He is a starter and has played for about 40 minutes of the game and is very winded and tired. What would you expect to find if you could look at one of his muscle cells mitochondria?

a. High levels of NADH

b. Low levels of Acyl-Carnitine

c. High levels of ATP

d. High levels of Acyl-CoA

19. How many rounds of Fatty Acid synthesis does it take to construct Myristate?

a. 9

b. 8

c. 7

d. 6

20. There is a defect in the production of NADPH by the Pentose phosphate pathway due to a mutation the first enzyme in this step. If fatty acid synthesis were to be conducted which enzyme would produce the NADPH required for this synthesis?

a. Malate Dehydrogenase

b. Citrate Lyase

c. Malic enzyme

d. Glucose-6-phospahte Dehydrogenase

21. After a meal insulin levels are high which signals muscle and adipose tissues to take up glucose. This high insulin level also cause

a. High levels of phosphorylated Acetyl-CoA Carboxylase

b. High levels of Protein Phosphatase 2A

c. High levels of fatty acid synthesis

d. High levels of active AMP-dependent Kinase

e. A&D

f. B&C

Muscle:

22. You are in the morgue and you always find that the cadavers are extremely stiff and hard to move around. This is commonly known as rigamortis. Why does this happen?

a. Myosin is continuing to contract at an unchecked level causing constant contraction of skeletal muscle

b. The myosin head cannot break free from the myosin binding site on actin due to a lack of ATP

c. Calcium is being continuously pumped into the sarcoplasm

d. Actin makes covalent bonds with the myosin head

23. This protein allows the sarcoplasmic reticulum to hold and retain a large amount of calcium when this calcium is being pumped back into the sarcoplasmic reticulum?

a. Calmodulin

b. Calsequestrin

c. Troponin

d. Tropomyosin

24. A toxic agent is being developed that causes the vasodilatation of blood vessels, halting of peristalsis, and decrease in the ability to urinate by blocking smooth muscle contraction exclusively. What protein would this inhibitor most likely block?

a. Myosin Light Chain Kinase

b. Troponin

c. Ryanodine Channels

d. Voltage-gated calcium channels

25. This enzyme helps to quickly replenish ATP for the continuously contracting heart muscle

a. Creatine Kinase

b. Myoglobin

c. Lactate Dehydrogenase

d. Tropomodulin

26. This protein holds actin parallel in the sarcomere and is attached to the Z-line.

a. Tropomodulin

b. Alpha-actinin

c. Nebulin

d. Z-line protein

27. You are running an experiment on two types of muscle tissue. You are measuring the intracellular concentrations of calcium. You notice that in muscle A, there is an initial increase in calcium coming from extracellular sources followed by a further dramatic increase in calcium coming from intracellular sources causing contraction. In muscle B, you notice there is only a dramatic increase in calcium in the sarcoplasm that comes from extracellular sources. In contrast to muscle B what may you find in muscle A?

a. Calcium Channels

b. Sarcoplasmic Reticulum ATPase

c. Myosin Light Chain Kinase

d. Na+/Ca2+ Exchanger

28. The initiation of contraction of skeletal muscle begins with

a. Depolarization of the Sarcolemma

b. Release of Calcium from the sarcoplasmic reticulum

c. Release of acetylcholine by a neuron and activation of acetylcholine receptors

d. Activation of the Dihydropyridine receptors

29. You tap a patient on the knee with your reflex hammer to test his reflexes of the quad muscles. This action results in stretch of the quad muscle and a normal reflex. What sensory receptor within the muscle helps regulate this process?

a. Muscle Spindle

b. Golgi Tendon Organ

c. Annulospiral nerve endings

d. Extrafusal Fibers

30. In the heart, specific chambers contract and pump blood at different times. What allows all the cardiac muscle cells in a chamber to contract at the same time?

a. Fascia Adherens

b. Desmosomes

c. Gap Junctions

d. T-Tubules

31. You are testing the strength of the gastrocnemius muscle at different angles. If zero degrees is the angle at which the muscle is fully contracted and 180 degrees is the angle at which it is fully stretched, why would more force be generated at ninety degrees as opposed to thirty degrees?

a. The muscle is at a greater length and thus the actin and myosin can slid past one another more than at thirty degrees

b. The muscle is a shorter length and thus the actin and myosin filaments do not have as far to travel as compared to the thirty degrees position

c. The muscle wouldn’t contract with greater force at ninety degrees

d. The muscle fiber is at its optimal length and will thus generate more force

32. You broke your tibia and have been in a cast for one month and have been on crutches. When you get the cast removed you notice that your calf muscle has gotten a lot smaller. What changes in your calf muscle structure caused this change?

a. Loss of muscle fibers

b. Reduction in the cross sectional area of individual muscle fibers

c. Reduction of motor unit number

d. Decrease in bone width

33. A 50 year old man who was never a long distance runner in his twenties has been training and running marathons for twenty years now. When looking at his muscle composition you would find

a. He has more Type IIa fibers than Type I fibers

b. He has more Type I fibers than Type IIa fibers

c. He has larger Type I fibers than Type IIa fibers

d. He has larger Type IIa fibers than Type I fibers

Neurons and Glia:

34. All of the following are functions of Glia cells EXCEPT

a. Maintaining microenvironment of nervous system tissue

b. Making up the blood brain barrier

c. Clearing out debris from nervous tissue

d. Secreting neurotransmitters to transmit signals

e. None of the Above

35. In a pathological stain of an Alzheimer’s brain you notice these tangled messes of proteins. What type of filaments are these tangles composed of?

a. Microtubules

b. Microfilaments

c. Actin

d. Neurofilaments

36. In the development of a new drug to treat brain cancer, the developer must design a drug that can travel through all of the following before reaching brain tissue from the blood EXCEPT

a. Pericyte

b. Astrocytic Process

c. Endothelial Cells

d. Basement membrane

e. None of the Above

Pentose Phosphate Pathway:

37. A patient comes into the ER complaining of extreme tiredness and dizziness. When looking at her record you notice that she has hemolytic anemia. What enzyme is most likely affected to cause this disorder?

a. Transketolase

b. Transaldolase

c. Glucolactonase

d. Glucose-6-Phosphate Dehydrogenase

38. The pentose phosphate pathway can be used to form a compound that is important in the synthesis of a number of molecules especially DNA and RNA. What molecule is this?

a. NADPH

b. Ribose

c. NADH

d. Fructose-6-phosphate

39. All are functions of the pentose phosphate pathway EXCEPT

a. Provide a source of NADPH for biosynthetic reactions

b. Produce Ribose

c. An alternate route to break down glucose

d. An alternate route to produce NADH for energy production

Interconversion of Hexoses:

40. A six month old is brought to the emergency room. The parents have been complaining that when given formula the baby begins to cry, vomit, and have diarrhea about thirty minutes after feeding. Upon further examination you notice that there is some clouding of the infant’s eyes and that the infant is slow to respond to all types of stimuli. A defect in what enzyme could result in these symptoms?

a. Uridine Diphosphogalatose-4-Epimerase

b. UDPG Pyrophosphorylase

c. Galatose-1-Phosphate Uridyl Transferase

d. Galatokinase

41. Which sugar(s) can be converted into glucose?

a. Galactose

b. Mannose

c. Fructose

d. Ribose

e. A & C

f. A, C, & D

g. All of the above

42. What is the primary function of UDP-Glucoronic Acid?

a. Being a high energy intermediate to conjugate Glucoronic acid to other molecules

b. To become detoxified in the liver

c. To produce ascorbic acid

d. To create more sugars that can be broken down by the pentose phosphate pathway